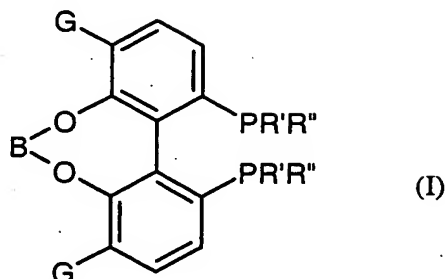


What is claimed is:

1. Compounds of the formula (I)



in which B is a bivalent moiety of the formula $-(CHR^1)_n-(R^2C=CR^3)-(CHR^4)_m$ where R^1 , R^2 , R^3 and R^4 are each independently hydrogen or alkyl, and n and m are each independently zero or an integer from 1 to 8, where, however, the sum of n and m is from 1 to 8, and in which, moreover,

G is chlorine or hydrogen and

R' and R'' are each independently aryl or alkyl or

in which B is a bivalent moiety of the formula $-(CHR^1)_n-(CR^2R^3)_m-(CHR^4)_o$ where R^1 , R^2 , R^3 and R^4 are each independently hydrogen or alkyl, preferably C_1 - C_6 -alkyl, and n, m and o are each independently zero or an integer from 1 to 8, where, however, the sum of n, m and o is from 1 to 8, preferably 3 or 4, and in which, moreover, G is chlorine and

R' and R'' are each independently aryl or alkyl.

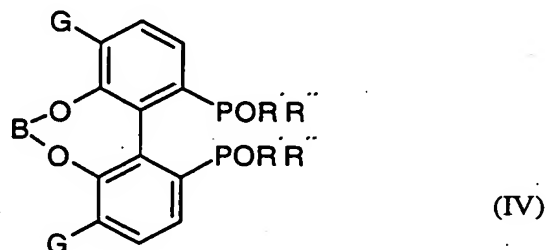
2. Compounds as claimed in claim 1, characterized in that R^1 , R^2 , R^3 and R^4 are each independently hydrogen, methyl, ethyl, n-propyl, isopropyl, n-butyl and n-pentyl.

3. Compounds as claimed in at least one of claims 1 and 2, characterized in that R' and R'' are each independently C₃-C₈-alkyl or C₅-C₁₀-aryl which may be unsubstituted, monosubstituted or polysubstituted by radicals which are selected from the group of chlorine, fluorine, cyano, phenyl, C₁-C₆-alkoxy and C₁-C₆-alkyl.
4. Compounds as claimed in at least one of claims 1 to 3, characterized in that they are the following:
- (R)- and (S)-[5,5'-dichloro-6,6'-(cis-1,4-but-2-enedioxy)biphenyl-2,2'-diyl]bis[(diphenyl)phosphine, (R)- and (S)-[5,5'-dichloro-6,6'-(cis-1,4-but-2-enedioxy)biphenyl-2,2'-diyl]bis[(dicyclohexyl)phosphine, (R)- and (S)-[5,5'-dichloro-6,6'-(cis-1,4-but-2-enedioxy)biphenyl-2,2'-diyl]bis[(di-3,5-di-tert-butyl-4-methoxyphenyl)phosphine, (R)- and (S)-[5,5'-dichloro-6,6'-(cis-1,4-but-2-enedioxy)biphenyl-2,2'-diyl]bis[(di-3,5-dimethylphenyl)phosphine, (R)- and (S)-[5,5'-dichloro-6,6'-(cis-1,4-but-2-enedioxy)biphenyl-2,2'-diyl]bis[(di-3,5-dimethyl-4-methoxyphenyl)phosphine, (R)- and (S)-[5,5'-dichloro-6,6'-(cis-1,4-but-2-enedioxy)biphenyl-2,2'-diyl]bis[(di-4-fluorophenyl)phosphine and also (R)- and (S)-[5,5'-dichloro-6,6'-(cis-1,4-but-2-enedioxy)biphenyl-2,2'-diyl]bis[(di-3,5-di-tert-butylphenyl)phosphine and also the corresponding trans compounds, (R)- and (S)-[5,5'-dichloro-6,6'-(1,3-propanedioxy)biphenyl-2,2'-diyl]bis[(diphenyl)phosphine, (R)- and (S)-[5,5'-dichloro-6,6'-(1,3-propanedioxy)biphenyl-2,2'-diyl]bis[(dicyclohexyl)phosphine, (R)- and (S)-[5,5'-dichloro-6,6'-(1,3-propanedioxy)biphenyl-2,2'-diyl]bis[(di-3,5-di-tert-butyl-4-methoxyphenyl)phosphine, (R)- and (S)-[5,5'-dichloro-6,6'-(1,3-propanedioxy)biphenyl-2,2'-diyl]bis[(di-3,5-dimethylphenyl)phosphine, (R)- and (S)-[5,5'-dichloro-6,6'-(1,3-propanedioxy)biphenyl-2,2'-diyl]bis[(di-3,5-dimethyl-4-methoxyphenyl)phosphine, (R)- and (S)-[5,5'-dichloro-6,6'-(1,3-propanedioxy)biphenyl-2,2'-diyl]bis[(di-4-fluorophenyl)phosphine and also (R)- and (S)-[5,5'-dichloro-6,6'-(1,3-propanedioxy)biphenyl-2,2'-diyl]bis[(di-3,5-di-tert-butylphenyl)phosphine, the stereoisomeric (R)- and (S)-[5,5'-dichloro-6,6'-(1,3-butanedioxy)biphenyl-2,2'-diyl]-bis(diphenyl)phosphines],

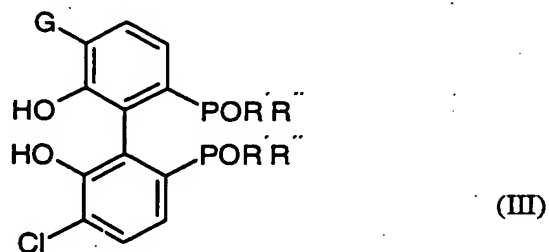
the stereoisomeric (R) and (S)-[5,5'-dichloro-6,6'-(1,3-butanedioxy)biphenyl-2,2'-diyl]bis(diphenylphosphines) and also any mixtures of the enantiomers.

5. A process for preparing compounds of the formula (IV)

5



in which B, G, R' and R'' are each as defined in claim 1, characterized in that compounds of the formula (III)



10

are reacted with a compound of the formula (VIa) or (VIb) or successively with two different compounds of the formulae (VIa) and (VIb)



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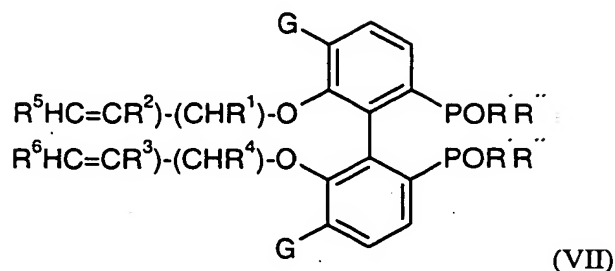


in which X³ and X⁴ are each chlorine, bromine, iodine or a sulfonate and

20

R¹, R², R³ and R⁴ are each as defined in claim 1, and R⁵ and R⁶ are each independently hydrogen or C₁-C₄-alkyl

to give compounds of the formula (VII)

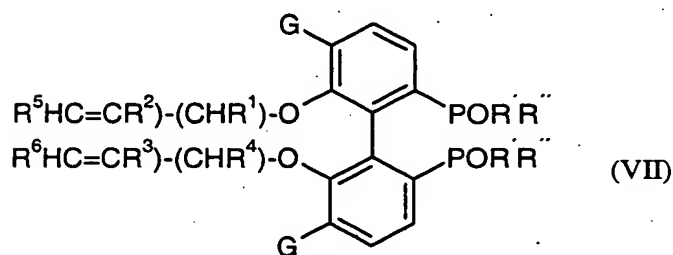


and the compounds of the formula (VII) are then converted in the presence of an olefin metathesis catalyst to compounds of the formula (IV).

5

6. The process as claimed in claim 5, characterized in that the compounds of the formula (VII) are subsequently reduced to compounds of the formula (I) as claimed in claim 1.

- 10 7. Compounds of the formula (VII)



in which R^1 , R^2 , R^3 , R^4 , R' and R'' are each as defined in claim 1 and

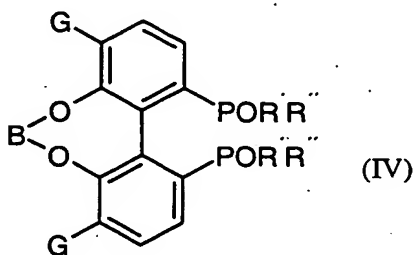
- 15 R^5 and R^6 are each independently hydrogen or C_1 - C_4 -alkyl.

8. Compounds as claimed in claim 7, characterized in that they are the following:

- 20 (R)- and (S)-[5,5'-dichloro-6,6'-(bisallyloxy)biphenyl-2,2'-diyl]bis[(di-cyclohexyl)phosphine oxide, (R)- and (S)-[5,5'-dichloro-6,6'-(bisallyloxy)-biphenyl-2,2'-diyl]bis[(di-3,5-di-tert-butyl-4-methoxyphenyl)phosphine oxide, (R)- and (S)-[5,5'-dichloro-6,6'-(bisallyloxy)biphenyl-2,2'-diyl]bis[(di-

3,5-dimethylphenyl)phosphine oxide, (R)- and (S)-[5,5'-dichloro-6,6'-(bisallyloxy)biphenyl-2,2'-diyl]bis[(di-3,5-dimethyl-4-methoxyphenyl)-phosphine oxide, (R)- and (S)-[5,5'-dichloro-6,6'-(bisallyloxy)biphenyl-2,2'-diyl]bis[(di-4-fluorophenyl)phosphine oxide and also (R)- and (S)-[5,5'-dichloro-6,6'-(bisallyloxy)biphenyl-2,2'-diyl]bis[(di-3,5-di-tert-butylphenyl)phosphine oxide.

9. Compounds of the formula (IV)



in which B, R' and R'' are each as defined in claim 1.

10. Compounds as claimed in claim 9, characterized in that they are the following:

(R)- and (S)-[5,5'-dichloro-6,6'-(cis-1,4-but-2-enedioxy)biphenyl-2,2'-diyl]bis[(dicyclohexyl)phosphine oxide, (R)- and (S)-[5,5'-dichloro-6,6'-(cis-1,4-but-2-enedioxy)biphenyl-2,2'-diyl]bis[(di-3,5-di-tert-butyl-4-methoxyphenyl)phosphine oxide, (R)- and (S)-[5,5'-dichloro-6,6'-(cis-1,4-but-2-enedioxy)biphenyl-2,2'-diyl]bis[(di-3,5-dimethylphenyl)phosphine oxide, (R)- and (S)-[5,5'-dichloro-6,6'-(cis-1,4-but-2-enedioxy)biphenyl-2,2'-diyl]bis[(di-3,5-dimethyl-4-methoxyphenyl)phosphine oxide, (R)- and (S)-[5,5'-dichloro-6,6'-(cis-1,4-but-2-enedioxy)biphenyl-2,2'-diyl]bis[(di-4-fluorophenyl)phosphine oxide and also (R)- and (S)-[5,5'-dichloro-6,6'-(cis-1,4-but-2-enedioxy)biphenyl-2,2'-diyl]bis[(di-3,5-di-tert-butylphenyl)phosphine oxide and also the corresponding trans compounds and also (R)- and (S)-[5,5'-dichloro-6,6'-(1,3-propanedioxy)biphenyl-2,2'-diyl]bis[(dicyclohexyl)phosphine oxide, (R)- and (S)-[5,5'-dichloro-6,6'-(1,3-

- propanedioxy)biphenyl-2,2'-diyl]bis[(di-3,5-di-tert-butyl-4-methoxyphenyl)phosphine oxide, (R)- and (S)-[5,5'-dichloro-6,6'-(1,3-propanedioxy)biphenyl-2,2'-diyl]bis[(di-3,5-dimethylphenyl)phosphine oxide, (R)- and (S)-[5,5'-dichloro-6,6'-(1,3-propanedioxy)biphenyl-2,2'-diyl]bis[(di-3,5-dimethyl-4-methoxyphenyl)phosphine oxide, (R)- and (S)-[5,5'-dichloro-6,6'-(1,3-propanedioxy)biphenyl-2,2'-diyl]bis[(di-4-fluorophenyl)phosphine oxide and also (R)- and (S)-[5,5'-dichloro-6,6'-(1,3-propanedioxy)biphenyl-2,2'-diyl]bis[(di-3,5-di-tert-butylphenyl)phosphine oxide, the stereoisomeric (R)-[5,5'-dichloro-6,6'-(1,3-butanedioxy)biphenyl-2,2'-diyl]-bis(diphenylphosphine oxides), the stereoisomeric (S)-[5,5'-dichloro-6,6'-(1,3-butanedioxy)biphenyl-2,2'-diyl]bis(diphenylphosphine oxides) and also any mixtures of the enantiomers.
11. Transition metal complexes comprising compounds as claimed in one or more of claims 1 to 4.
12. Catalysts comprising transition metal complexes as claimed in claim 11.
13. A process for the transition metal-catalyzed preparation of enantiomerically enriched compounds, characterized in that it is carried out in the presence of catalysts as claimed in claim 13.